Italian Botanist 15: 35–47 (2023)
doi: 10.3897/italianbotanist.15.103781
https://italianbotanist.pensoft.net

RESEARCH ARTICLE

Italian Botanist
Published by Società Botanica Italiana

Notulae to the Italian flora of algae, bryophtes, fungi and lichens: 15

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Academic editor: Lorenzo Peruzzi | Received 23 March 2023 | Accepted 11 April 2023 | Published 19 April 2023

Citation: Ravera S, Puglisi M, Vizzini A, Totti C, Azzella MM, Bacilliere G, Bolpagni R, Breuss O, Cogoni A, De Giuseppe AB, Fačkovcová Z, Faltner F, Gheza G, Giordani P, Isocrono D, Mair P, Malíček J, Marino P, Mayrhofer H, Nascimbene J, Ongaro S, Paoli L, Passalacqua NG, Poponessi S, Puntillo D, Raimondo FM, Sicoli G, Tratter W (2023) Notulae to the Italian flora of algae, bryophtes, fungi and lichens: 15. Italian Botanist 15: 35–47. https://doi.org/10.3897/italianbotanist.15.103781

Abstract

In this contribution, new data concerning algae, bryophytes, fungi and lichens of the Italian flora are presented. It includes new records and confirmations for the algal genus *Nitella*, for the bryophyte genera *Anthoceros*, *Dicranodontium*, *Fontinalis*, and *Riccia*, the fungal genera *Inocybe* and *Xerophorus*, and the lichen genera *Bagliettoa*, *Biatora*, *Calicium*, *Cladonia*, *Coniocarpon*, *Lecanora*, *Opegrapha*, *Placynthium*, *Rhizocarpon*, *Scytinium*, *Solenopsora*, *Stereocaulon*, and *Verrucaria*.

Keywords

Ascomycota, Basidiomycota, Biodiversity, Bryidae, Charophyceae

How to contribute

The text of the records should be submitted electronically to: Cecilia Totti (c.totti@univpm.it) for algae, Marta Puglisi (mpuglisi@unict.it) for bryophytes, Alfredo Vizzini (alfredo.vizzini@unito.it) for fungi, Sonia Ravera (sonia.ravera@unipa.it) for lichens. Each text should be within 1,000 characters (spaces included).

Floristic records

Algae

Nitella capillaris (Krocker) J.Groves & Bullock-Webster (Characeae)

+ **LAZ**: Ceprano (Frosinone), tiny temporary pool on the southern side of the via Sfratti woodland (WGS84: 33T 371658.4600583), 130 m, 25 February 2023, leg. *R. Bolpagni*, det. *M.M. Azzella* (RO). – Species confirmed for the flora of Lazio.

Both female and male individuals were found growing sparsely in a small (not more than 1 m^2) temporary pool not very far from the highway crossing (via Carl Vepu). In Italy, *Nitella capillaris* has been recently confirmed for Sicilia (Romanov et al. 2019), while the reports for peninsular Italy date back to more than 50 years ago (Bazzichelli and Abdelahad 2009). This record is a confirmation of the species for the flora of Lazio 60 years after the last reports (Corillion and Guerlesquin 1963).

M.M. Azzella, R. Bolpagni

Bryophytes

Anthoceros agrestis Paton (Anthocerotaceae)

+ **TAA**: Walchhorn, E of Reischach, Brunico, Val Pusteria (Bolzano), on the edge of a stubble cornfield, near hedges on siliceous soil (UTM WGS84: 32T 726187.5184209), 1038 m, 24 September 2022, *F. Faltner*, conf. *P. Mair* (Herb. Faltner; BOZ BRYO 8353). – Species new for the flora of Trentino-Alto Adige.

Anthoceros agrestis is quite similar to *A. punctatus* L., from which it can be distinguished essentially for the size of the mature antheridia, mostly about 80 µm long. It is mainly distributed in the temperate zone of central Europe but is rather rare in the Mediterranean-Atlantic parts (Hodgetts and Lockart 2020). In Italy, *A. agrestis* is signaled with old records for Piemonte, Toscana, Campania, and Sardegna, while more recent data (after 1968) are available for Lombardia (Brusa 2019), Lazio, Vatican City State, Calabria, and Sicilia (Aleffi et al. 2020). In the new locality it was found with *Riccia* sp. pl. and *Tortula truncata* (Hedw.) Mitt. This species is assessed as Near Threatened in Europe (Hodgetts et al. 2019).

F. Faltner, P. Mair

Dicranodontium asperulum (Mitt.) Broth. (Leucobryaceae)

+ **EMR**: Passo della Scalucchia, Alpe di Succiso (Reggio Emilia) (UTM WGS84 32T 5979945.4912109), 1346 m, 21 July 2018, *S. Poponessi* (Bryo/AR002). – Specie new for the flora of Emilia-Romagna.

Dicranodontium asperulum is a Boreal-montane species with main distribution in North America, SE Asia (China, Japan Nepal, India), and central Europe, while it is very rare in the Mediterranean countries (Hodgetts and Lockart 2020). In Italy it occurs only in Piemonte, Veneto, Umbria, and was recorded before 1968 in Lombardia and Trentino-Alto Adige (Aleffi et al. 2020). The species prefers sheltered moist sites where it grows on acidic soils in montane heath, on ledges or crevices among acidic rocks. It is easily recognized by the wide-spreading leaves, standing out from the stem at 45° or more when wet, the serrate to serrulate shoulders of the leaf bases and the long arista which is serrate all around. In the new locality, *D. asperulum* was found on acidic soil at the base of *Fagus sylvatica* L., together with *Plagiotecium denticulatum* (Hedw.) Schimp. var. *denticulatum*, *Radula complanata* (L.) Dumort., *Brachytheciastrum velutinum* (Hedw.) Ignatov & Huttunen, and *Pterygynandrum filiforme* Hedw.

S. Poponessi, G. Bacilliere

Fontinalis hypnoides var. *hypnoides* C.Hartm. (Fontinalaceae)

+ **SAR**: Rio Santa Lucia, Assemini (Cagliari) (UTM WGS84 32T 50226.4338222), on riverbed rocks of the river Rio Santa Lucia, 82 m, 24 September 2020, *S. Poponessi*, *A. De Agostini*, *A. Cogoni* (CAG SA2.2.3). – Variety confirmed for the flora of Sardegna.

Fontinalis hypnoides var. *hypnoides* is an aquatic moss growing submerged in standing or slow-moving water, including slightly eutrophic lakes, slow flowing rivers, or in reed-beds, normally attached to stones and wood. It is quite common in Europe (Hodgetts and Lockart 2020). According to Aleffi et al. (2020), *F. hypnoides* var. *hypnoides* is known in Italy from Veneto, Abruzzo, Puglia, Calabria and, with old records, Lombardia, Lazio and Sardegna. In Sardegna it was previously signalled more than a century ago from a few sites located in the eastern part of the island (Cardot 1882; Barbey 1884; Fleischer 1893). *Fontinalis hypnoides* var. *hypnoides* is distinguished from other species in the genus by its medium size and monomorphic leaves consistently plane at the apices.

S. Poponessi, A. Cogoni

Riccia breidleri Jur. ex Steph. (Ricciaceae)

+ **TAA**: Oberer Hintergratsee, Sulden, Stilfser Joch/Stelvio National Park, Ortler Alps (Bozen/Bolzano), on damp, muddy, fine sandy shores (calcareous morainic material on phyllitic bedrock) of the small remnant of this alpine lake, partly drying out in summer (UTM WGS84: 32T 621420.5150986), 2650 m, 7 July 2017, *W. Tratter* (BOZ BRYO 8351); ibidem, 12 September 2022, *leg. P. Mair*, conf. *H. Köckinger* (BOZ BRYO 8352); East side of the Unterer Hintergratsee, Sulden, Stilfser Joch/Stelvio National Park, Ortler Alps (Bozen/Bolzano), on damp and dry, muddy shore edges, (UTM WGS84: 32T 621585.5150646), 2596 m, 12 September 2022, *P. Mair*. – Species new for the flora of Trentino-Alto Adige.

Riccia breidleri is endemic to Alps (Hodgetts et al. 2020), growing above 2000 m of elevations. This species grows on acidic soil in temporary pools that fill with melting snow water in the spring. In Italy it is only known for Piemonte, Valle d'Aosta, and Lombardia (Aleffi et al. 2020). *Riccia breidleri* is included in Annex II of the Habitats Directive of the EU and in the Appendix I of the Bern Convention, and considered Vulnerable in the European red list of bryophytes (Hodgetts et al. 2019).

P. Mair, W. Tratter

Fungi

Inocybe langei R.Heim (Inocybaceae)

+ **CAL**: Botanical Garden, University of Calabria, Rende (Cosenza), on the ground under the crown of downy oak (*Quercus pubescens* Willd.) trees (UTM WGS84: 33S 605921.435728), 210 m, 5 September 2022, *G. Sicoli*, *A.B. De Giuseppe*, *N.G. Passalacqua* (CLU F323). – Species new for the flora of Calabria.

A group of solitary, but gregarious, basidiomata belonging to *Inocybe langei* was observed on the ground among the litter of *Quercus pubescens* trees. The pilei were broadly conical and slightly umbonate when young, then almost applanate with age, less than 3 cm wide, straw-coloured, but a bit darker ochre in the centre, and fibrillose.

The stipe was pale, rather short and robust, with a slightly bulbose base, covered by crested caulocystidia especially along the upper half. The gills were beige-gray, the edge showing ventricose-lageniform and crested cheilocystidia. Spores were amygdaliform and 6.5–8.5 × 3.5–5 µm in size, thus shorter than those belonging to the closely-related species *I. hirtella* Bres., which is also characterised by the smell of almonds not recorded in our samples (Printz 1992; Courtecuisse and Duhem 1995). So far, *Inocybe langei* has been reported only in northern Italy (Onofri et al. 2013).

G. Sicoli, A.B. De Giuseppe, N.G. Passalacqua

***Xerophorus donadinii* (Bon) Vizzini, Consiglio & M.Marchetti (Callistosporiaceae)**

+ CAL: Botanical Garden, University of Calabria, Rende (Cosenza) (UTM WGS84: 33S 605857. 4357281), on the ground under the crown of a pedunculate oak tree (*Quercus robur* L.), 200 m, 21 October 2022, *A.B. De Giuseppe*, *N.G. Passalacqua*, *G. Sicoli* (CLU F325). – Species new for the flora of Calabria.

A group of six small, gregarious and collybioid basidiomata was observed on the ground on the litter under a planted tree of *Quercus robur*. The youngest pilei were hemisphaeric convex and with an involute edge; the most mature ones were more applanate, matt, smooth, dark brown with a reddish tone in the centre, paler at the edge, and 1.0–2.5 cm wide. The lower side of the pileus showed distant, emarginated and pale yellowish gills supported by a lemon-yellow, slender, flexuose and fibrillose stipe with white rhizomorphs attached at the base. Spores were amygdaliform, smooth, hyaline, and 7–9 × 4–5 µm in size. Cheilocystidia were scattered and cylindrical, no pleurocystidia were observed. Smell and taste resulted indistinct. Based on the above characters and ecology, this fungus was identified as *Xerophorus donadinii*. This species, was first described as *Callistosporium olivascens* var. *donadinii* Bon, ecologically distinct from the proper *C. olivascens* (Boud.) Bon, currently *X. olivascens* (Bon) Vizzini, Consiglio & M.Marchetti, which prefers association with cedar trees. Further differences are also morphological: *X. donadinii* has pilei with smaller diameters, without an evident umbo, with a more reddish shade in the centre, and a paler and more involute edge; the stipe is also slenderer than in *X. olivascens* (Courtecuisse and Duhem 1995; Vizzini et al. 2020). In Italy, *X. donadinii* has so far been reported always on broadleaved trees, only in Emilia-Romagna, Marche, and Puglia (Vizzini et al. 2020).

A.B. De Giuseppe, N.G. Passalacqua, G. Sicoli

Lichens

***Bagliettoa baldensis* (A.Massal.) Vězda (Verrucariaceae)**

+ **CAL**: Campotenese, E Monte Pollino (Cosenza) (UTM WGS84 33S 592440.441491), on limestone, c. 1000 m, 30 May 1979, *H. Mayrhofer* (no. 22024 GZU). – Species confirmed for the flora of Calabria.

This species is widespread in Italy on compact calcareous rocks with optimum in the submediterranean belt (Nimis 2016; Nimis and Martellos 2023). The only previous record in Calabria was from Valle di Fiume Argentino (Halda 2003: 35, sub *Verrucaria baldensis*) but it is currently not included in the Information System on Italian Lichens (Nimis and Martellos 2023).

H. Mayrhofer, O. Breuss

Biatora mendax Anzi (Ramalinaceae)

+ **LOM**: Bagni di Masino, Valmasino (Sondrio), on bark of *Fagus sylvatica* L. in an old-growth beech forest (UTM WGS84: 32T 546327.5121063), 1137 m, 23 August 2019, leg. *G. Gheza*, det. *H. Mayrhofer* (PAV). – Species confirmed for the flora of Lombardia.

Biatora mendax was previously known from Lombardia only from Val di Tartano, Val del Bitto and Val Malenco (Anzi 1862; Anzi Lich. Rar. Lang. Exs. n.168: Printzen 1995); its distribution is now extended to Val Masino. It was collected in a moist, old-growth beech stand (Natura 2000 Habitat 9110 "Luzulo-Fagetum beech forests"), which is coherent with it having its optimum in humid beech forests (Nimis and Martellos 2023). It is listed in the Red List of Italian epiphytic lichens as "endangered" (Nascimbene et al. 2013).

G. Gheza, H. Mayrhofer

Calicium denigratum (Vain.) Tibell (Caliciaceae)

+ **ITA** (**TAA**): Fiè allo Sciliar (Bolzano) (UTM WS84: 32T 694257.5153572), on bark of *Pinus sylvestris* L., 1165 m, 4 May 2012, *J. Nascimbene*, conf. *J. Hafellner* (CLU No. 18230). – Species new for the flora of Trentino-Alto Adige.

Calicium denigratum is recognizable for its tall, thin, and shiny black ascomata with stalk of sclerotized, dark, irregularly interwoven hyphae and distinct bell-shaped capitulum lacking pruina. Spores have a coarsely cracked surface (Tibell 1999). The species could be confused with *C. glaucellum* Ach. and *C. abietinum* Pers. but the former has an obovoid to lenticular capitulum with white pruina and coarsely cracked spores with ridges and the latter has a black lenticular capitulum with minutely warted spores. This species occurs in open canopy woodlands in Europe and Siberia (Tibell 1999). It is reported also for North America (McMullin et al. 2012). This is the first Italian collection but the species is likely widespread throughout the Italian Alps.

J. Nascimbene, D. Puntillo

Cladonia trassii Ahti (Cladoniaceae)

+ **LOM**: Valle delle Messi, Ponte di Legno (Brescia), on soil above siliceous rock in an open larch stand (UTM WGS84: 32T 614582.5129878), 1686 m, 19 August 2020, *G. Gheza* (BOLO). – Species confirmed for the flora of Lombardia.

Cladonia trassii is an arctic-alpine species with squamulose verticillate podetia with very narrow scyphi (Gheza and Nimis 2021). It was previously recorded in Lombardia only from the high elevation coniferous forests of Mount Confinale, in Valtellina (Anzi 1868, as "*Cladonia stricta*", cited by Rivellini and Valcuvia Passadore 1996). Our specimen contains fumarprotocetraric acid and atranorin. It was collected together with *Cladonia arbuscula* (Wallr.) Flot., *C. chlorophaea* (Sommerf.) Spreng., *C. furcata* (Huds.) Schrad., *C. macroceras* (Delise) Hav., *C. pleurota* (Flörke) Schaer., and *C. rangiferina* (L.) F.H.Wigg. (Gheza et al. 2022).

G. Gheza, H. Mayrhofer

***Coniocarpon fallax* (Ach.) Grube (Arthoniaceae)**

+ **LOM**: road between Dezzo di Scalve and Passo della Presolana, Colere (Bergamo) (UTM WGS84: 32T 585785.5090970), on bark of *Alnus incana* (L.) Moench in a sheltered and moist broadleaved stand within a mixed forest, 810 m, 4 January 2023, *G. Gheza* (BOLO). – Species confirmed for the flora of Lombardia.

Coniocarpon fallax is an oceanic crustose lichen harbouring a trentepohlioid photobiont characterized by the orange-rusty red pruina along the margin of confluent elongated or stellate lirellae (Frisch et al. 2020). The only previous record from Lombardia was from the surroundings of Como by Anzi (1860); a collection by the latter author (*Lich. Min. Rar. Ital.* n. 317) was also reported in Stizenberger (1882) and Sundin and Tehler (1998).

G. Gheza

***Lecanora subcarpinea* Szatala (Lecanoraceae)**

+ **SAR**: along a road in pasture, Gavoi (Nuoro) (UTM 32T 515790.4448723), on bark of *Prunus* sp., 850 m, 1 May 2012, *J. Malíček* (PRA). – Species new for the flora of Sardegna.

Lecanora subcarpinea is a crustose epiphytic lichen belonging to the *L. carpinea-L. leptyrodes* complex, found on smooth and base-rich bark of isolated trees, which occurs also in well-lit or sparse forests, from the mesomediterranean to the subalpine belt. According to Nimis and Martellos (2023), it appears that this species has not always been correctly identified, and the Italian material collected so far would need revision. This sample, collected in the typical habitat of *L. subcarpinea*, is characterized by strongly pruinose apothecia and a distinct Pd+ bright yellow reaction of the apothecial margin, which is coherent with the taxon description.

J. Malíček, S. Ravera

***Opegrapha vermicellifera* (Kunze) J.R.Laundon (Opegraphaceae)**

+ **TAA**: Toblino lake, path in the holm oak forest above the lake, eastern slope (Trento) (UTM WGS84 32T: 651601.5102080), on *Quercus ilex* L., 200 m, 25 May 2005, *P. Giordani, F. Cristofolini* (GE). – Species new for the flora of Trentino-Alto Adige.

Opegrapha vermicellifera is a crustose lichen with *Trentepohlia* as photobiont, characterized by a pale grey to whitish thallus. Thalli without apothecia, such as the one found in Toblino, have numerous and prominent pycnidia. In Italy, the species usually colonises large trees in humid areas, especially along large rivers and lakes, both in the Padanian and subalpine regions (Nimis and Martellos 2023) and in the Mediterranean (Nascimbene et al. 2021).

P. Giordani

***Placynthium nigrum* (Huds.) Gray (Placynthiaceae)**

+ **VDA**: Val Veny, Courmayeur (Aosta) (UTM WGS84: 32T 341129.5075178), on north-east facing walls, 1353 m, 8 November 2021, *S. Ongaro*, *D. Isocrono* (ORO). – Species confirmed for the flora of Valle d'Aosta.

Placynthium nigrum is a saxicolous species distinguished by its dark thallus with a conspicuous bluish-black prothallus. Despite being a widespread species in the Alps (Nimis et al. 2018), *P. nigrum* is rarely collected in Valle d'Aosta (Piervittori and Isocrono 1999), where it is uncommon due to the regional climatic and geological characteristics. The only two previous records for this region were from a coniferous forest in Valpelline (Henry 1910), and from broad-leaved forest in Arnad (Henry 1914).

D. Isocrono, S. Ongaro

***Rhizocarpon norvegicum* Räsänen (Rhizocarpaceae)**

+ **LOM**: ridge between Monte Pagano and Monte Pianaccio, Monno (Brescia), on *Pleopsidium flavum* (Trevis.) Körb. on a schist rock outcrop (UTM WGS84: 32T 604483.5123088), 2170 m, 12 August 2022, *G. Gheza* (BOLO); ridge between Monte Tonale Occidentale and Cima Cadì, Ponte di Legno (Brescia), on *P. flavum* on a schist rock outcrop (UTM WGS84: 32T 620459.5126438), 2610 m, 4 June 2022, *G. Gheza* (Herb. Gheza). – Species new for the flora of Lombardia.

Rhizocarpon norvegicum is a yellow-greenish crustose chlorolichen, which often starts its life cycle on thalli of Acarosporaceae on schistaceous rocks (Nimis and Martellos 2023). In Italy, it was reported so far only from Friuli Venezia Giulia and Trentino-Alto Adige (Nimis and Martellos 2023), but it is likely more widespread in the Italian Alps.

G. Gheza, J. Nascimbene

***Scytinium fragrans* (Sm.) Otálora, P.M.Jørg. & Wedin (Collemataceae)**

+ **SIC**: Corleone (Palermo), on *Ulmus minor* subsp. *canescens* Bartolucci & Galasso (UTM WGS84: 33S 350022.4180983), 625 m, 28 June 2022, leg. *P. Marino*, *F.M. Raimondo*, *S. Ravera*, det. *S. Ravera* (PAL). – Species confirmed for the flora of Sicilia.

Scytinium fragrans is a small-foliose to subsquamulose epiphytic cyanolichen occurring in natural or semi-natural habitats, extremely rare or extinct in northern Italy

(Nimis and Martellos 2023), whose last report in Sicilia dates back to the beginning of the 1900s (Jatta 1909–1911).

S. Ravera, P. Marino, F.M. Raimondo

***Solenopsora liparina* (Nyl.) Zahlbr. (Leprocaulaceae)**

+ **LOM**: IlGroppo, Brallo di Pregola (Pavia), on serpentine outcrops close to the road Casone-Pregola (UTM WGS84: 32T 521498.4955086), 947 m, 17 September 2022, *Z. Fačkovcová*, *L. Paoli* (Herb. SAV) – Species new for the flora of Lombardia.

Solenopsora liparina has a crustose-placodioid thallus, forming orbicular (up to 2.5 cm) rosettes, with the central parts sometimes falling off and leaving semicircular arcs of olivaceous grey or grey-green lobes, with rounded white-pruinose margins. It is a Mediterranean species colonizing inclined surfaces of ultrabasic rocks such as serpentines, often preferring fissures, in shaded situations also on vertical faces, in habitats with low eutrophication. So far in Italy it was recorded only from Liguria and Toscana (Guttová and Nimis 2021; Nimis and Martellos 2023). The distribution of *S. liparina* along the Apennine Peninsula seems strongly associated to a combination of geology (i.e. presence of serpentine and other ultramafic outcrops) and climate (preference for localities with temperate climate and warm winters) and recently developed habitat suitability maps highlighted higher probabilities of occurrence along the Tyrrhenian side (Guttová et al. 2019).

L. Paoli, Z. Fačkovcová

***Stereocaulon incrustatum* Flörke (Stereocaulaceae)**

+ **PIE**: Sesia riverbed near Greggio (Vercelli) (UTM WGS84: 32T 452951.5032689), on siliceous sandy-pebbly soil in a dry grassland colonizing the riverbed, 157 m, 23 December 2020, *G. Gheza* (PAV). – Species confirmed for the flora of Piemonte.

Stereocaulon incrustatum typically grows on mineral oligotrophic soils, often near rivers (Nimis and Martellos 2023). It was reported from "the surroundings of Vercelli" with specimens collected in 1858 (Lamb 1977; Watson 2014; Oset 2015; TSB-25735; E.C.I. n. 194). This record confirms its occurrence in the area near Vercelli after more than 150 years since the latest record, and after more than a century since the last record from the same administrative region (Martel 1911). The analysed specimen contained only atranorin, which is reported as the most widespread chemotype by Oset (2015).

G. Gheza

***Verrucaria endocarpoides* Servít (Verrucariaceae)**

+ **MAR**: Badia di S. Pietro, Monte Conero, Sirolo (Ancona) (UTM WGS84: 33T 388234.4822510), in a *Quercus ilex* L. wood on limestone, c. 470 m, 5 June 1979, *H. Mayrhofer* (GZU no. 22022). – Species new for the flora of Marche.

+ **TOS**: along the lane from Carrara to Campocecina, E of the hill La Pizza, surroundings of Carrara (Massa-Carrara) (UTM WGS84: 32T 588905.4884717), E-facing limestone cliff, c. 800 m, 1 June 1978, *H. Mayrhofer* (GZU no. 22023). – Species new for the flora of Toscana.

Verrucaria endocarpoides is one out of many species with a thick, brown, areolate thallus. It is characterized by immersed perithecia with an involucrellum reaching down to exciple-base level, medium-sized ascospores, and stout periphyses. The species is apparently widespread but poorly known. In Italy it was previously reported from Friuli (Breuss 2008a) and from its type locality in Liguria (Breuss 2008b, Servít 1952).

H. Mayrhofer, O. Breuss

***Verrucaria lecideoides* (A.Massal.) Trevis. (Verrucariaceae)**

+ **CAL**: Campotenese, E Monte Pollino (Cosenza) (UTM WGS84 33S 592440.441491), on limestone, c. 1000 m, 30 May 1979, *H. Mayrhofer* (no. 22021 GZU). – Species new for the flora of Calabria.

Verrucaria lecideoides belongs to a small group of species with a distinctly areolate, epilithic, autonomous thallus and with perithecia mostly at the margins of, or between the areoles; its perithecia are encircled by an involucrellum that extends down to exciple-base level and incurves beneath. It does not fit within the (core group of) genus *Verruculopsis* that is morphologically different, lacks an involucrellum and is parasitic on Teloschistacean hosts (Navarro-Rosinés et al. 2007). The species is widespread in Italy on exposed calciferous rocks (Nimis 2016; Nimis and Martellos 2023).

O. Breuss, H. Mayrhofer

Acknowledgements

Sonia Ravera acknowledges the support of NBFC to University of Palermo, funded by the Italian Ministry of University and Research, PNRR, Missione 4 Componente 2, "Dalla ricerca all'impresa", Investimento 1.4, Project CN00000033.

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